

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
29 January 2004 (29.01.2004)

PCT

(10) International Publication Number
WO 2004/009940 A1

(51) International Patent Classification⁷: E06B 1/02
(21) International Application Number: PCT/PT2002/000012

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(22) International Filing Date: 18 July 2002 (18.07.2002)

(25) Filing Language: English

(26) Publication Language: English

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(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GH, GM, IR, IT, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

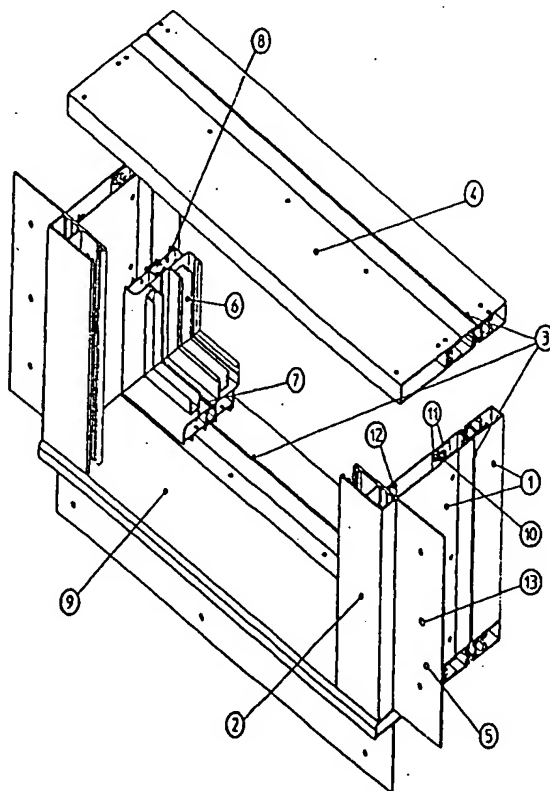
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(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: INTEGRAL FRAME SYSTEM FOR WINDOWS AND DOORS



(57) Abstract: An integral frame system, made from extruded aluminum sections (1), for fixing windows and doors of buildings, that is water tight and particularly resistant to the impact caused to storms, having tracks for window and door shutters fully integrated (2), possessing a thermal break system throughout (3) and in which all of its elements may be attached jointly to the outer wall of buildings, from the exterior, with great ease, made possible by its lateral and lower flanges.

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Published:

- with international search report
- with amended claims and statement

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

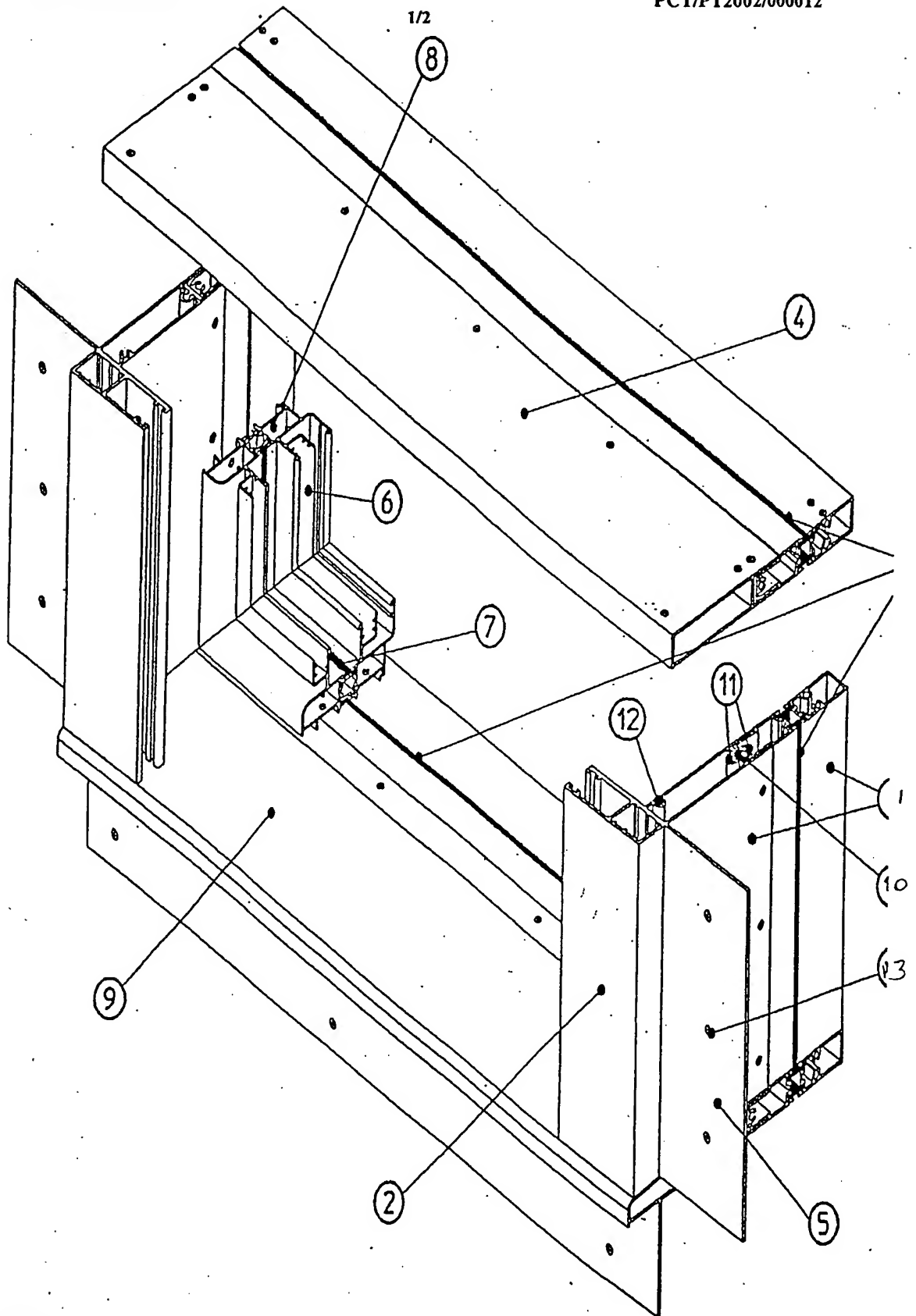


FIG.1

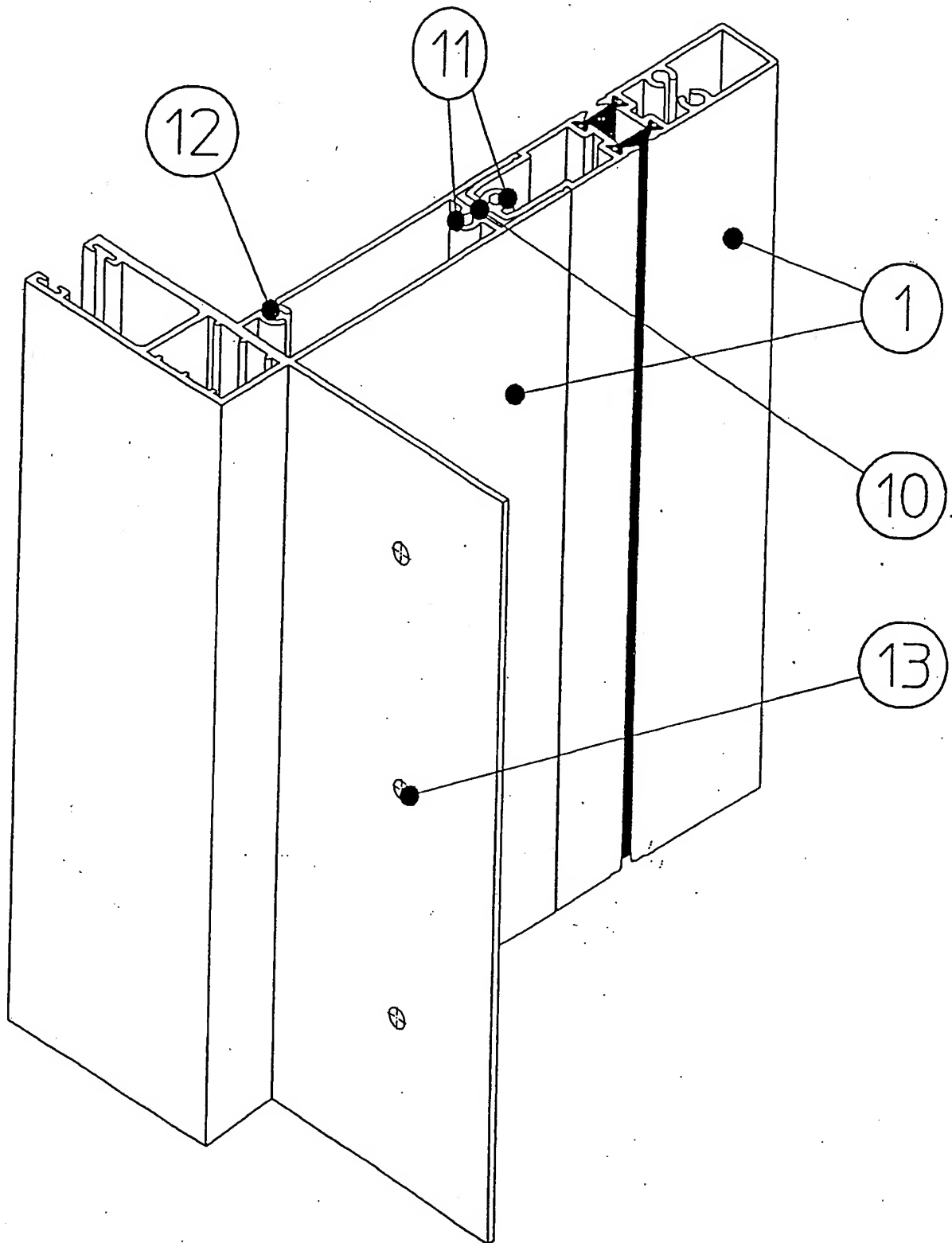


FIG.2

INTEGRAL FRAME SYSTEM FOR WINDOWS AND DOORS

DESCRIPTION

Background:

The problem of protecting buildings and homes against storms, more especially hurricanes, has been an on-going problem faced by known construction techniques, predominantly in certain coastal areas of the United States of America, that are more vulnerable to such occurrences. Doors and windows of buildings are the most susceptible elements in attempting to protect buildings against storms. This is due to the fact that their failure to provide adequate resistance to the force of the elements, will allow strong air currents to permeate which will contribute, apart from other damages wrought, to the implosion of the edifice itself.

State of the art:

Patents cited:

US 6,378,254

US 5,755,270

US 5,540,018

US 5,487,244

US 5,595,233

US 5,596,849

US 5,740,639

US 6,289,642

US 6,189,264

US 5,918,430

US 5,907,929

US 5,857,298

The techniques currently used for doors and windows that are especially resistant to storms include, among others, laminated impact resistant glass, windows with impact protective systems such as accordion shutters, Bahamas shutters, colonial shutters, rolling shutters, storm panels and plywood sheathing.

However, although all of the systems described below meet the applicable building codes and especially the new laws that have come into force along the coastal regions of the United States of America that are most vulnerable to hurricanes, they have several shortcomings:

- 1) Impact glass: when hurricane debris strikes the window, the glass breaks but is held in place by the laminate thus avoiding the internal pressurization which causes structural damage as well as water intrusion from the rain. However, it is not possible to merely replace the glass, it is necessary to remove the entire frame which must be replaced. This also implies new interior and exterior trim and paint. This becomes quite costly to the consumer and to the insurance industry, which in turn raises its premiums after houses are damaged by these type of wind storm events.
- 2) Accordion shutters: this system is placed on the outside of the window or door opening and is manually dragged across the opening when a hurricane threatens. The drawbacks of this system are several: a ladder is required to close them if the home does not have double hung windows; they are not very attractive aesthetically, they require a great deal of maintenance and can be very expensive, particularly when the cost of the windows must also be included in addition to the shutter, when calculating the total cost.
- 3) Bahamas shutters: this system, while architecturally pleasing, has the following disadvantages: a ladder is required to close them; they spoil the view from the windows because the shutters are in the way, and these shutters cannot be applied over doors.

- 4) Colonial shutters: This traditional system of shutters must be closed from the exterior and therefore requires the use of a ladder to affix the required protective bars. This system cannot be applied to large openings in buildings due to the clearance space required on the sides of the openings.
- 5) Roll down shutters: this system is the most costly although it is also the most versatile since the shutter can be operated inside and outside, manually or by electrical means. However, the cost of the windows, the frame and installation are high and not very attractive as the boxes accommodating the shutters are located outside the building.
- 6) Storm panels: this is a system of corrugated panels that are placed into permanently mounted tracks that are located above or below the window or door opening. The disadvantages of these panels are, principally, the following: they are too heavy for the elderly to manage, they create storage issues, they require a ladder to install and are very time consuming to put up.

Advantages of the present invention:

The invention which is the subject of this patent application seeks to avoid the disadvantages of the systems outlined above: a) it can be used by any age group or by the handicapped; b) it prevents water infiltration from seeping through the window frame due to the flanges that are built into the system; c) the system can be fitted with all types of different window and door manufacturer products for new construction or remodeling; d) it is fastened to the exterior by stainless steel screws inserted into 2 x 4 stud wall jacks for strength; e) includes a new thermal break system designed specifically for the integral frame system for the temperatures indigenous to the hurricane prone regions in the eastern coastal regions of the US; f) it is more cost effective than retro-fitting an existing window in already built homes with a new window and roll down shutter; g) it is more cost effective to install on new constructions since all that the builders has to do is raise the header to accommodate the roll shutter box size; h) it will save money on service charges for scaffolding and labor charges since the frame system is designed to allow access from the inside of the

house; (i) it will not deteriorate from UV rays such as the vinyl windows and are much stronger due to the frame being manufactured out of structural aluminum; (j) it allows homeowners, builders and property management companies to quickly close up their homes when threatened by a hurricane and can then evacuate the affected region faster, without having to lose precious minutes or hours boarding up with plywood, panels or storm shutters; (l) allows for greater security from looting in the aftermath of the storm since the tracks secure the roll shutter from being removed; (m) it is aesthetically pleasing since its elements are integrated and the frame may be covered by wood trim or other materials.

Now follows a more detailed description of the invention with reference to the attached drawings which show the following:

Fig. 1, a view of the integral frame system with various numbered components, in accordance with the description below and with the header separated;

Fig. 2, a magnified view of a part of the previous figure containing the aluminum sections with thermal break system.

Description of the invention:

The invention consists of:

- 1) An integral frame system, for windows and doors, that is water tight in its installation with all its elements fully integrated (Fig. 1), so that they are attached conjointly to the construction in question;
- 2) An inner frame in extruded aluminum (1) as deep as the walls of the construction, to which are coupled, on the outside, the water tight shutter tracks (2) of the window (or door), made of aluminum with a minimum thickness of (0,18cms) 0.07 inches to be able to withstand the frontal impact of a storm;
- 3) The inner frame (1) possesses a thermal break system throughout (3), which is made possible by the extruded aluminum used to build the entire system.
- 4) The upper part or header (4) of this integral frame system for windows and doors acts as a support for the shutter box coupled to it.

- 5) The same frame, by means of its flanges, approximately 7.63 cms (three inches) wide (5) which are part of the same integral system, permit the system to be affixed to the wall of the edifice from the exterior with great ease.
- 6) A frame which allows a window or door to be attached (6) with a thermal break system (7) in its interior, attached by means of screws (8).
- 7) The sill (9) has a 4° angle descending outwards, which allows for proper drainage of water.
- 8) This sill is optional in the case of doors, where the lower flange is also removed.
- 9) The extruded aluminum sections (1) (Fig. 2) must have sufficient space between them, where they fit together (10), to absorb the impact caused by a storm.
- 10) The sections are also characterized by the position of the screw grooves (11), which should, whenever possible, be rotated in the opposite direction to the impact from the storm, or at least, have a minimum rotation of 30° degrees in the opposite direction to the impact (facing inwards) (12).

CLAIMS

- 1) Frame for mounting windows and doors in buildings, made of aluminum sections, characterized by consisting of a single block structure, that is water tight and having all of its components fully integrated, that is particularly resistant to storms.
- 2) Frame, in accordance with claim 1), characterized by the inclusion in its single integrated system (1) two lateral flanges, approximately 7.63 cms (three inches) wide and one lower flange flanges, approximately 7.63 cms (three inches) wide (5), except in the case of doors, which are attached to buildings from the exterior, by means of screws (13).
- 3) Frame, in accordance with claim 1), characterized by), the inclusion in its single integrated system (1) the tracks for water tight shutters for windows or doors, which must have a minimum thickness of 0,18cms (0.07 inches), in order to withstand the frontal impact of storms.
- 4) Frame, in accordance with claim 1), characterized by, the inclusion in its single integrated system (1) a thermal break system throughout (3), which is made possible by the system being made entirely from extruded aluminum.
- 5) Frame, in accordance with claim 1), characterized by the aluminum sections (1) having a sufficient space between them, in the area where they fit together, to absorb the impact caused by storms. This space functions, therefore, like a veritable "expansion joint" of the system.
- 6) Aluminum sections in accordance with claim 5), characterized by the respective grooves for the screws (11) and their position, which must be rotated in the opposite direction to the impact of the storm, wherever possible, or, rotated at least 30 degrees inwards, in the opposite direction to the impact (12), so as to increase the strength of the entire system.

AMENDED CLAIMS

[Received by the International Bureau on 15 May 2003 (15.05.03)]

- 1) Frame for mounting windows and doors in buildings, made of aluminum sections, characterized by consisting of a single block structure, made of extruded aluminum, that is water tight and having all of its components fully integrated, that is particularly resistant to storms.
- 2) Frame, in accordance with claim 1), characterized by the inclusion in its single integrated system (1) two lateral flanges, approximately 7.63 cms (three inches) wide and a minimum of 2 mm thick, and one lower flange, except in the case of doors, approximately 7.63 cms (three inches) wide and a minimum of 2 mm thick (5), which are attached to buildings from the exterior, by means of screws (13), reducing the rigidity that would result from interior as well as exterior attachment, providing the necessary flexibility to the entire system.
- 3) Frame, in accordance with claim 1), characterized by), the inclusion in its single integrated system (1) the tracks for water tight shutters for windows or doors, which must have a minimum thickness of 0,18cms (0.07 inches), in order to withstand the frontal impact of storms.
- 4) Frame, in accordance with claim 1), characterized by, the inclusion in its single integrated system (1) a thermal break system throughout (3), which is made possible by the system being made entirely from extruded aluminum.
- 5) Frame, in accordance with claim 1), characterized by the aluminum sections (1) having a sufficient space between them, in the area where they fit together, to absorb the impact caused by storms. This space functions, therefore, like a veritable "expansion joint" of the system.
- 6) Aluminum sections in accordance with claim 5), characterized by the respective grooves for the screws (11) and their position, which, in the critical elements, must be rotated in the opposite direction to the impact of the storm, or, rotated at least 30 degrees inwards, in the opposite direction to the impact (12), so as to increase the strength of the entire system.

10 5 MAY 2003

PCT/PT 02/00012

**"Integral frame system for windows and doors
For hurricane protection from wind-borne debris"**

Statement under article 19(1) (Rule 46.4)

Amendment to claim 1:

Amendment is altered in view of patent DE 4237606 and is intended to clarify the fact that the single block structure of the frame is made of extruded aluminum as opposed to other current materials, such as pvc which is prevalent in the state of the art, which is an essential contribution to the system's resistance to hurricane impact.

Amendment to claim 2:

Amendment is altered in view of patent DE 4237606 and specifies the minimum thickness of the flanges, which lends them the required resistance to impact as well as the clarification that they are attached only to the exterior and not also the interior, providing system with the required flexibility. Interior attachments result in rigidity which would cause the frame to break rather than "give" under the storm's impact.

Amendment to claim 6:

Amendment is altered in view of patent DE 4237606 and US 5 660 010. The amendment is intended to clarify that the position and rotation of the grooves is essential to the resistance and flexibility of the structure in its critical elements, i.e., the parts that directly receive the brunt of the storm's impact.

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Text of initial claims prior to amendments

- 1) Frame for mounting windows and doors in buildings, made of aluminum sections, characterized by consisting of a single block structure, that is water-tight and having all of its components fully integrated, that is particularly resistant to storms.
- 2) Frame, in accordance with claim 1), characterized by the inclusion in its single integrated system (1) two lateral flanges, approximately 7.63 cms (three inches) wide and one lower flange flanges, approximately 7.63 cms (three inches) wide (5), except in the case of doors, which are attached to buildings from the exterior, by means of screws (13).
- 6) Aluminum sections in accordance with claim 5), characterized by the respective grooves for the screws (11) and their position, which must be rotated in the opposite direction to the impact of the storm, wherever possible, or, rotated at least 30 degrees inwards, in the opposite direction to the impact (12), so as to increase the strength of the entire system.

INTERNATIONAL SEARCH REPORT

PCT/PT 02/00012

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E06B1/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 E06B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 42 37 606 A (WEIMAR KARL HEINZ) 13 May 1993 (1993-05-13)	1-4
Y	column 1, line 23 - line 41 column 1, line 53 - column 2, line 7 column 2, line 22 - column 3, line 18 figures	5,6
Y	US 5 660 010 A (SAYERS LELAND D) 26 August 1997 (1997-08-26) column 4, line 35 - column 6, line 34; figures 2-4	5,6
A	DE 100 43 965 A (BAYER HARALD ;KEMMERER KLEMENS (DE)) 21 March 2002 (2002-03-21) the whole document	1-6
	-/-	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex

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Date of the actual completion of the international search

13 March 2003

Date of mailing of the international search report

20/03/2003

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 200 12 102 U (NAGEL PAUL S) 22 February 2001 (2001-02-22) figures BLATT-16-28	1-3,5

INTERNATIONAL SEARCH REPORT

PCT/PT 02/00012

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 4237606	A	13-05-1993	DE 4237606 A1	13-05-1993
			DE 9116239 U1	27-05-1992
			DE 59205348 D1	28-03-1996
			EP 0541117 A1	12-05-1993
US 5660010	A	26-08-1997	US 5392574 A	28-02-1995
DE 10043965	A	21-03-2002	DE 10043965 A1	21-03-2002
DE 20012102	U	22-02-2001	DE 20012102 U1	22-02-2001
			WO 0204777 A1	17-01-2002

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